KSN 2021
FULLY VIRTUAL MEETING
September 02 (Thu) - 05 (Sun)

## Abstract Submission No. : 2501

# Effects of dietary zinc on chronic kidney disease and overall survival

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**Objectives:** Zinc plays a role in gene expression and protein synthesis and is crucial for cellular differentiation. However, the biological effects of zinc on human health are debatable. In this study, we aimed to investigate the effects of zinc on chronic kidney disease and overall survival among participants in NHANES dataset.

**Methods:** A total of 41,907 adult participants (aged over 18 years old) in NHANES 2003-2016 were enrolled in this study. Amount of dietary zinc intake was calculated using dietary recall methods, and serum concentration of zinc were measured using inductively coupled plasma dynamic reaction cell mass spectrometry. Chronic kidney disease was defined as glomerular filtration below 60 ml/min/1.73 m2 or urinary albumin-to-creatinine ratio above 30 mg/g. Effects of zinc on chronic kidney disease was tested by multivariate logistic regression, and effects on mortality was tested by multivariable Cox analysis. Multivariable analysis included covariates of age, gender, ethnicity, body mass index, diabetes mellitus, and hypertension.

**Results:** Mean amount of dietary zinc intake was 11.4 ± 8.2 (mg/day), and mean concentration of serum zinc was 81.8 ± 15.4 ㎍/dL. Dietary intake of zinc and serum concentration of zinc was not associated with the prevalence of diabetes mellitus and hypertension. However, increased intake of dietary zinc was associated with reduced prevalence of chronic kidney disease (OR 0.989 (0.984-0.993), $p < 0.001$). In addition, higher serum zinc concentration was also associated with reduced prevalence of chronic kidney disease (OR 0.992 (0.986-0.998), $p = 0.014$). In survival analysis, participants with higher intake of zinc showed decreased risk of mortality (overall $p = 0.008$; HR of Q2 0.85 (0.77-0.94); HR of Q3 0.80 (0.72-0.89); HR of Q4 0.84 (0.75-0.94)).

**Conclusions:** Higher intake of dietary zinc and increased serum zinc concentration are associated with reduced prevalence of chronic kidney disease.